What’s New in Cocoa

Session 115

These are confidential sessions—please refrain from streaming, blogging, or taking pictures.

What’s New in Cocoa

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Cocoa Frameworks

What's New in Cocoa

Only on Mac OS

- We will:
  - Cover changes in Cocoa since Leopard
  - Give more coverage to changes since WWDC 2008
  - Provide pointers to other talks
- This is not "What's New in Cocoa Touch"

What's New in Cocoa Touch	Pacific Heights Tuesday 10:30AM

Topics

- 64-Bit
  - Replacements for Carbon APIs
- Blocks and Concurrency
- UTIs and Text Services
- NSCollectionView and Friends
- File System Efficiency
- And More
  - NSImage
  - Multi-Touch
  - Etc.

64-Bit

64-Bit

- In the works for a while
  - 10.4—System.framework
  - 10.5—All frameworks
  - 10.6—Almost all applications, commands, and daemons

"64-Bit Applications: Not in Leopard,
But Post-Leopard Likely Some Day."

WWDC 2006, Session 110: 64-Bit Overview

64-Bit Cocoa

- New types
  - NSInteger replaces int
  - NSUInteger replaces unsigned int
  - CGFloat replaces float

```
#if __LP64__
  typedef long          NSInteger;
  typedef unsigned long NSUInteger;
  typedef double        CGFloat;
#else
  typedef int           NSInteger;
  typedef unsigned int  NSUInteger;
  typedef float         CGFloat;
#endif
```

64-Bit Conversion

- Convert your sources to use the new types
- SnowLeopard has a new script to automate the process

```
/Developer/Extras/64BitConversion/ConvertCocoa64
```

- Run it on a copy of your sources

```
> cd MyAppSources
> /Developer/Extras/64BitConversion/ConvertCocoa64 `find . -name '*.[hm]' | xargs`
Processing ./AmazingView.m
Processing ./MyPlugIn/SomeSource.h
...
```

- Open original and new sources in FileMerge to check changes

64-Bit Conversion

- Check out the “64-Bit Transition Guide for Cocoa”
  - http://developer.apple.com/documentation/Cocoa/Conceptual/Cocoa64BitGuide/Introduction/Introduction.html

Carbon APIs in 64-Bit

- High-level Carbon frameworks not available
- Many replacement APIs have been added to Cocoa

NSApplication

- New APIs to control system user interface elements
  - Dock, menu bar, task switcher…

```
- (void)setPresentationOptions:(NSApplicationPresentationOptions)options;
- (NSApplicationPresentationOptions)presentationOptions;

- (NSApplicationPresentationOptions)currentSystemPresentationOptions;
```

- KVO-observable, even when another app changes the setting

NSApplication

- NSApplicationPresentationOptions

```
enum {
    NSApplicationPresentationDefault                    = 0,
    NSApplicationPresentationAutoHideDock               = (1 << 0),
    NSApplicationPresentationHideDock                   = (1 << 1),
    NSApplicationPresentationAutoHideMenuBar            = (1 << 2),
    NSApplicationPresentationHideMenuBar                = (1 << 3),
    NSApplicationPresentationDisableAppleMenu           = (1 << 4),
    NSApplicationPresentationDisableProcessSwitching    = (1 << 5),
    NSApplicationPresentationDisableForceQuit           = (1 << 6),
    NSApplicationPresentationDisableSessionTermination  = (1 << 7),
    NSApplicationPresentationDisableHideApplication     = (1 << 8),
    NSApplicationPresentationDisableMenuBarTransparency = (1 << 9)
};
```

NSWindow

- Disable server-side dragging

```
- (void)setMovable:(BOOL)flag;
- (BOOL)isMovable;
```

- Window “hit test”

```
+ (NSInteger)windowNumberAtPoint:(NSPoint)screenLocation
     belowWindowWithWindowNumber:(NSInteger)number;
```

- Collect window numbers of visible windows

```
+ (NSArray *)windowNumbersWithOptions:(NSWindowNumberListOptions)options;
```

NSRunningApplication

- Get info about applications running on the system

```
@interface NSRunningApplication : NSObject

@property (readonly, getter=isTerminated) BOOL         terminated;
@property (readonly, getter=isFinishedLaunching) BOOL finishedLaunching;
@property (readonly, getter=isHidden) BOOL             hidden;              // KVO
@property (readonly, getter=isActive) BOOL             active;              // KVO
@property (readonly) NSApplicationActivationPolicy     activationPolicy;    // KVO
@property (readonly) NSString                         *localizedName;
@property (readonly) NSString                         *bundleIdentifier;
@property (readonly) NSDate                           *launchDate;
@property (readonly) NSImage                          *icon;
@property (readonly) NSURL                            *bundleURL;
@property (readonly) NSURL                            *executableURL;
@property (readonly) NSInteger                         executableArchitecture;
@property (readonly) pid_t                             processIdentifier;
...
```

NSRunningApplication

- Hide, terminate, or activate applications

```
- (BOOL)hide;
- (BOOL)unhide;
- (BOOL)terminate;
- (BOOL)forceTerminate;
- (BOOL)activateWithOptions:(NSApplicationActivationOptions)options;
```

NSRunningApplication

- Getting a hold of running applications

```
+ (NSRunningApplication *)currentApplication;
+ (NSRunningApplication *)runningApplicationWithProcessIdentifier:(pid_t)pid;
+ (NSArray *)runningApplicationsWithBundleIdentifier:(NSString *)bundleIdentifier;
```

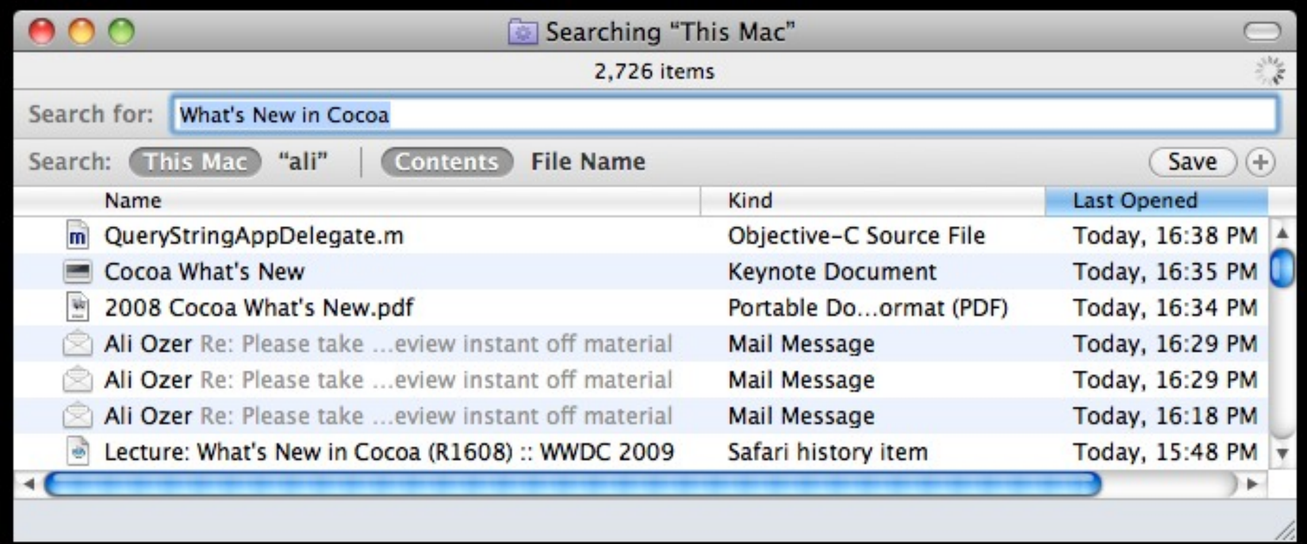
```
@interface NSWorkspace (NSWorkspaceRunningApplications)
- (NSArray *)runningApplications;
@end
```

NSWorkspace

- Display a Spotlight search results window in Finder for the specified query string

```
- (BOOL)showSearchResultsForQueryString:(NSString *)queryString;
```

- User can further fine tune the search using Finder

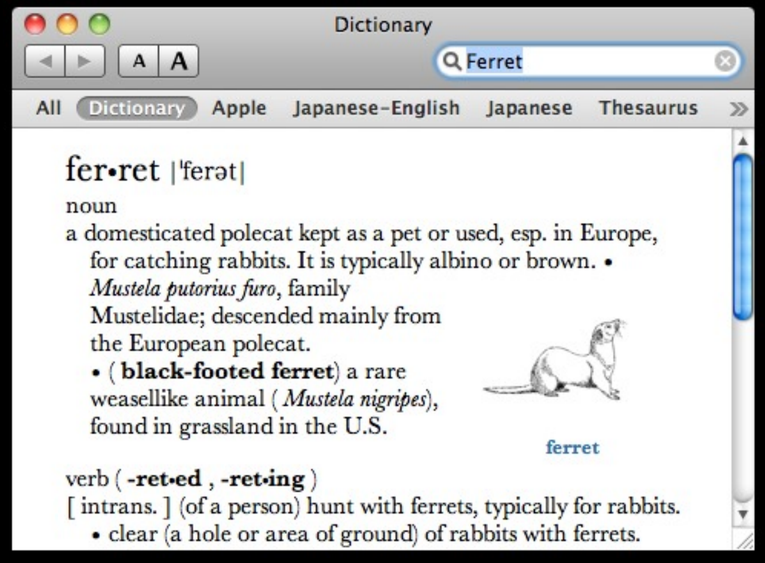


NSView

- Bring up Dictionary application for a piece of text

```
- (void)showDefinitionForAttributedString:(NSAttributedString *)attrString
                                  atPoint:(NSPoint)textBaselineOrigin;

- (void)showDefinitionForAttributedString:(NSAttributedString *)attrString
                                    range:(NSRange)targetRange
                                  options:(NSDictionary *)options
                    baselineOriginProvider:(NSPoint (^)(NSRange adjustedRange))provider;
```



NSPasteboard

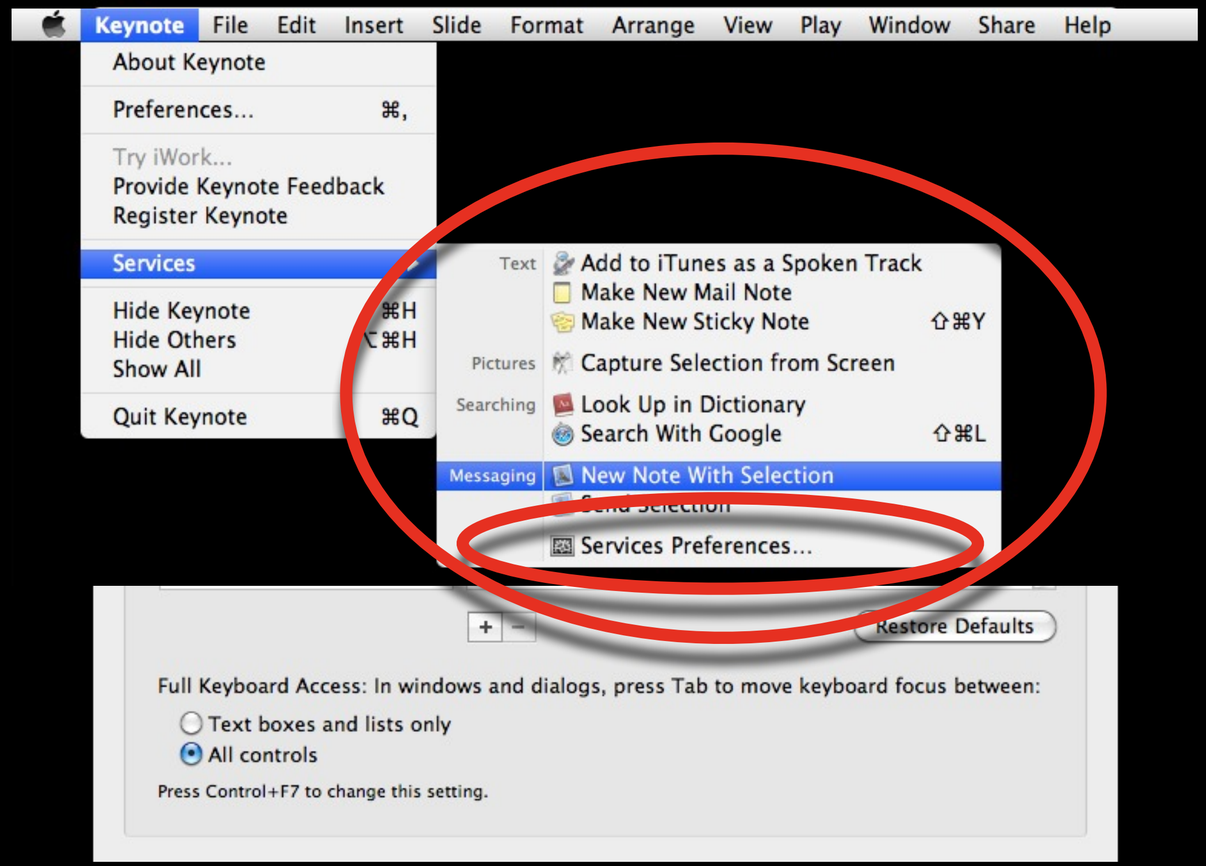
- Support for multiple items
- New, more general API
  - UTI-based
  - NSPasteboardWriting and NSPasteboardReading protocols
  - NSPasteboardItem class

Pasteboards, Services, and Interoperability on Mac

North Beach
Thursday 2:00PM

Services

- More discoverable
- Context sensitive
- User customizable



Pasteboards, Services, and Interoperability on Mac

North Beach
Thursday 2:00PM

NSMenu

- Display a menu as a popup

```
- (BOOL)popUpMenuPositioningItem:(NSMenuItem *)item
                      atLocation:(NSPoint)location
                          inView:(NSView *)view;
```

- Allow delegate to control menu location

```
- (NSRect)confinementRectForMenu:(NSMenu *)menu onScreen:(NSScreen *)screen;
```

- Stop menu tracking and dismiss menu

```
- (void)cancelTrackingWithoutAnimation;
```

NSEvent

- Get user preference settings

```
+ (NSTimeInterval)doubleClickInterval;
+ (NSTimeInterval)keyRepeatDelay;
+ (NSTimeInterval)keyRepeatInterval;
```

- Get keyboard and mouse state outside of the event stream

```
+ (NSUInteger)modifierFlags;
+ (NSUInteger)pressedMouseButtons;
```

NSEvent Monitoring

- Monitor (and affect) events in the current app

```
+ (id)addLocalMonitorForEventsMatchingMask:(NSEventMask)mask
                                   handler:(NSEvent *(^)(NSEvent *))block;
```

- Or monitor events sent to any app

```
+ (id)addGlobalMonitorForEventsMatchingMask:(NSEventMask)mask
                                    handler:(void (^)(NSEvent *))block;
```

- Stop monitoring

```
+ (void)removeMonitor:(id)eventMonitor;
```

User Events in Cocoa	Nob Hill Wednesday 3:30PM

Blocks

Blocks

- Snippets of code that capture lexical scope

```
int multiplier = 7;

int (^myBlock)(int) = ^(int num) { return num * multiplier; };
```

We're declaring a variable "myBlock." The "^" declares this to be a block

This is a literal block definition, assigned to variable myBlock

myBlock is a block that returns an int

It takes a single argument, also an int

The argument is named num

This is the body of the block

```
printf("%d", myBlock(3));          // Prints 21
```

Objective-C and Garbage Collection Advancements

Russian Hill
Wednesday 5:00PM

Blocks

- Used as an argument to an Objective-C method

Method Taking a Block Argument

Argument 1 (NSString)

Argument 2 (pointer to BOOL)

```
@interface NSString
- (void)enumerateLinesUsingBlock:(void (^)(NSString *line, BOOL *stop))block;
@end
```

Block Return Type (None here)

Argument Name

Text Processing in Cocoa

Presidio
Friday 9:00AM

Blocks

- Used in a new typedef

```
typedef NSComparisonResult (^NSComparator)(id obj1, id obj2);
```

Argument 1 (An Object)

Argument 2 (An Object)

Block Return Type

Type Being Defined

```
@interface NSArray
- (NSArray *)sortedArrayUsingComparator:(NSComparator)comparator;
@end
```

```
NSArray *sortedArray = [myArray sortedArrayUsingComparator:
            ^(id str1, id str2) {return [str1 localizedStandardCompare:str2];}
 ];
```

Block Naming

- “Block” is a challenging name
  - [myArray block];
  - [window beginSheet: block:]
- Instead of “block,” use more descriptive names
  - Handler
  - Provider
  - Test
  - Comparator
- “Block” only for the generic cases

Block-Based Collection Functionality

- NSArray sorting

```
- (NSArray *)sortedArrayUsingComparator:(NSComparator)comparator;
```

- Enumeration

```
- (void)enumerateObjectsUsingBlock:(void (^)(id obj, NSUInteger i, BOOL *stop))block;
```

- Searching

```
- (NSIndexSet *)indexesOfObjectsPassingTest:(BOOL (^)(id obj,
                                                      NSUInteger i,
                                                      BOOL *stop))predicate;
```

- Additional APIs
  - Versions of these for NSDictionary, NSSet, and NSIndexSet
  - Variants taking options and subset to work on

Concurrency

Concurrent Collection Functionality

- Enumerate, search, or sort concurrently
- Provide as option: NSEnumerationConcurrent or NSSortConcurrent

```
NSArray *array = [myArray sortedArrayWithOptions:NSSortConcurrent
                                 usingComparator:^(id str1, id str2) {
                                     return [str1 localizedStandardCompare:str2];
                                 }];
```

- The provided block may be invoked concurrently
- The overall operation is still synchronous
- The order of enumeration is undefined

NSOperation and NSOperationQueue

- Now implemented on top of GCD
- New API
  - NSOperation
    - Set thread priority
    - Specify a completion block
  - NSOperationQueue
    - Add multiple operations and optionally wait until all done
    - Add block as an operation
  - NSBlockOperation

NSNotificationCenter

- Now allows observers to get notifications concurrently

```
- (id)addObserverForName:(NSString *)name
                  object:(id)object
                   queue:(NSOperationQueue *)queue
              usingBlock:(void (^)(NSNotification *))block;
```

- Compare to Leopard API

```
- (void)addObserver:(id)observer
           selector:(SEL)aSelector
               name:(NSString *)name
             object:(id)object;
```

NSNotificationCenter

- Now allows observers to get notifications concurrently

```
- (id)addObserverForName:(NSString *)name
                  object:(id)object
                   queue:(NSOperationQueue *)queue
              usingBlock:(void (^)(NSNotification *))block;
```

- No change to the notification posting code
  - All observers finished before posting code continues

Concurrent Drawing

- NSView subclassers can opt-in to be drawn concurrently with other views

```
- (void)setCanDrawConcurrently:(BOOL)flag;
- (BOOL)canDrawConcurrently;
```

- -display or -displayIfNeeded blocked until all drawing done
  - In most cases thread-safety demands on the model unchanged

Concurrent Programming in Cocoa	North Beach Wednesday 9:00AM

TextEdit Enhancements

Concurrent Document Opening

Concurrent Document Opening

- Thread-safe document creation
  - init…
  - readFrom…
    - Disable undo registration
  - makeDocumentWithContentsOfURL:
  - openDocumentWithContentsOfURL:display:error:
    - TextEdit: Transient document

Concurrent Document Opening

- Override canConcurrentlyReadDocumentsOfType:

```
+ (BOOL)canConcurrentlyReadDocumentsOfType:(NSString *)typeName {
    NSWorkspace *workspace = [NSWorkspace sharedWorkspace];
    return !([workspace type:typeName
              conformsToType:(NSString *)kUTTypeHTML] ||
             [workspace type:typeName
              conformsToType:(NSString *)kUTTypeWebArchive]);
}
```

UTIs

- File type abstraction
  - Extensions
  - HFS type codes
  - MIME types
  - NSPasteboard type names
  - NSDocument type names
- Unified hierarchical type system
- Reduce complexity
- Snow Leopard recognizes over 400 UTIs out of the box
- Extensible

UTI Changes in Info.plist

```
<dict>
	<key>CFBundleTypeExtensions</key>
	<array>
		<string>rtf</string>
	</array>
	<key>CFBundleTypeIconFile</key>
	<string>rtf.icns</string>
	<key>CFBundleTypeMIMETypes</key>
	<array>
		<string>text/rtf</string>
	</array>
	<key>CFBundleTypeName</key>
	<string>NSRTFPboardType</string>
	<key>CFBundleTypeOSTypes</key>
	<array>
		<string>RTF </string>
	</array>
	<key>CFBundleTypeRole</key>
	<string>Editor</string>
	<key>LSIsAppleDefaultForType</key>
	<true/>
	<key>NSDocumentClass</key>
	<string>Document</string>
</dict>
```

UTI Adoption

- Info.plist
  - Use UTIs for Services declarations
- Switch from old type names to UTIs

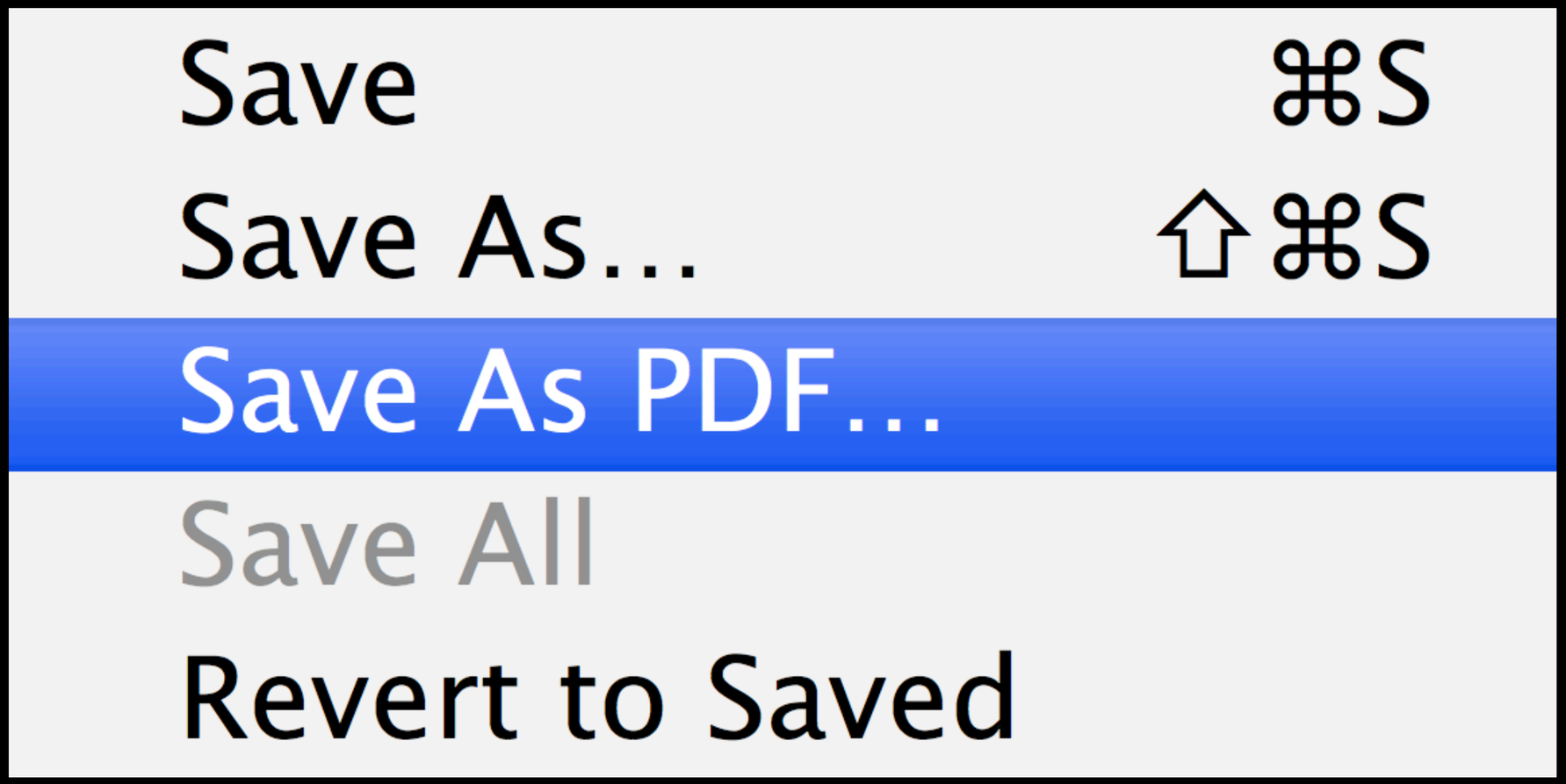
```
[aType isEqual:otherType];
```

```
[[NSWorkspace sharedWorkspace] type:aType conformsToType:otherType];
```

- Few changes

```
-[NSDocument readFromURL:ofType:error:]
-[NSDocument fileWrapperOfType:error:]
-[NSDocument writeableTypesForSaveOperation:]
-[NSDocument autosavingFileType]
-[NSDocumentController defaultType]
Services methods
```

Save as PDF…



Save as PDF…

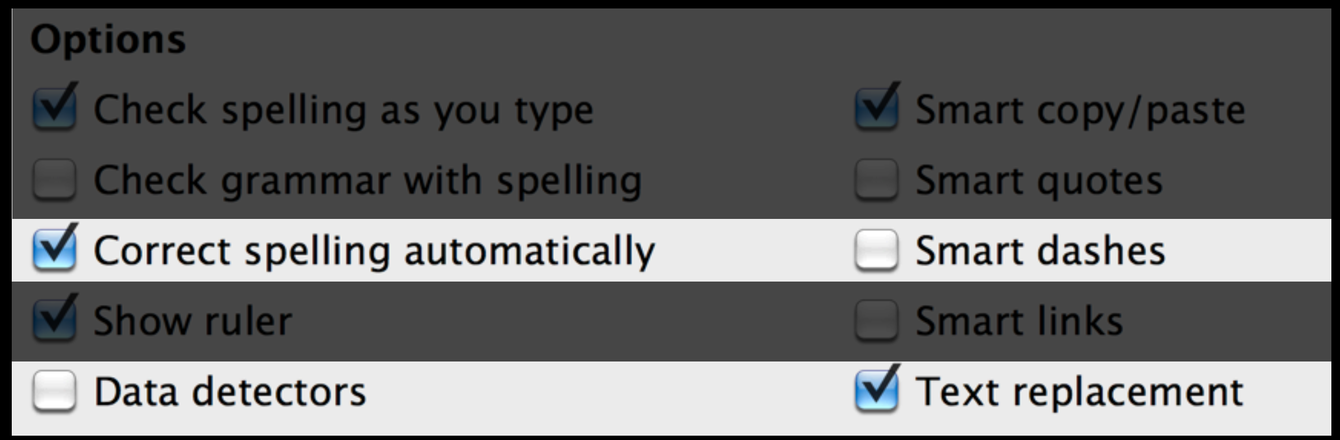
```
- (IBAction)saveDocumentAsPDFTo:(id)sender {
    NSSavePanel *savePanel = [NSSavePanel savePanel];
    NSString *path = [[self fileURL] path];
    NSString *defaultPDFFileName = [[path lastPathComponent] stringByDeletingPathExtension];
    [savePanel setRequiredFileType:@"com.adobe.pdf"];
    [savePanel setCanSelectHiddenExtension:YES];
    if (defaultPDFFileName) [savePanel setNameFieldStringValue:defaultPDFFileName];
    NSWindow *window = [[[self windowControllers] objectAtIndex:0] window];
    [savePanel beginSheetModalForWindow:window completionHandler:^(NSInteger result) {
        if (result == NSFileHandlingPanelOKButton) {
            NSDictionary *settings = [NSDictionary dictionaryWithObjectsAndKeys:
                NSPrintSaveJob, NSPrintJobDisposition,
                [savePanel filename], NSPrintSavePath,
                nil];
            [self printDocumentWithSettings:settings
                               showPrintPanel:NO
                                     delegate:nil
                             didPrintSelector:NULL
                                  contextInfo:NULL];
            if ([savePanel isExtensionHidden]) {
                NSDictionary *attributes = [NSDictionary dictionaryWithObjectsAndKeys:[NSNumber numberWithBool:YES],
NSFileExtensionHidden, nil];
                [[NSFileManager defaultManager] setAttributes:attributes ofItemAtPath:[savePanel filename] error:NULL];
            }
        }
    }];
}
```

Text Checking

- Spell checking
- Leopard
  - Grammar checking
  - Quote substitution
  - Link detection
- Snow Leopard
  - Language and script identification
  - Data detectors
  - Dash substitution
  - Automatic text replacement and spelling correction

Text Checking in TextEdit

- Preferences



- Configure NSTextView

```
-setAutomaticSpellingCorrectionEnabled:
-setAutomaticDashSubstitutionEnabled:
-setAutomaticDataDetectionEnabled:
-setAutomaticTextReplacementEnabled:
```

Text Checking

- New APIs
  - NSTextView
  - NSSpellChecker

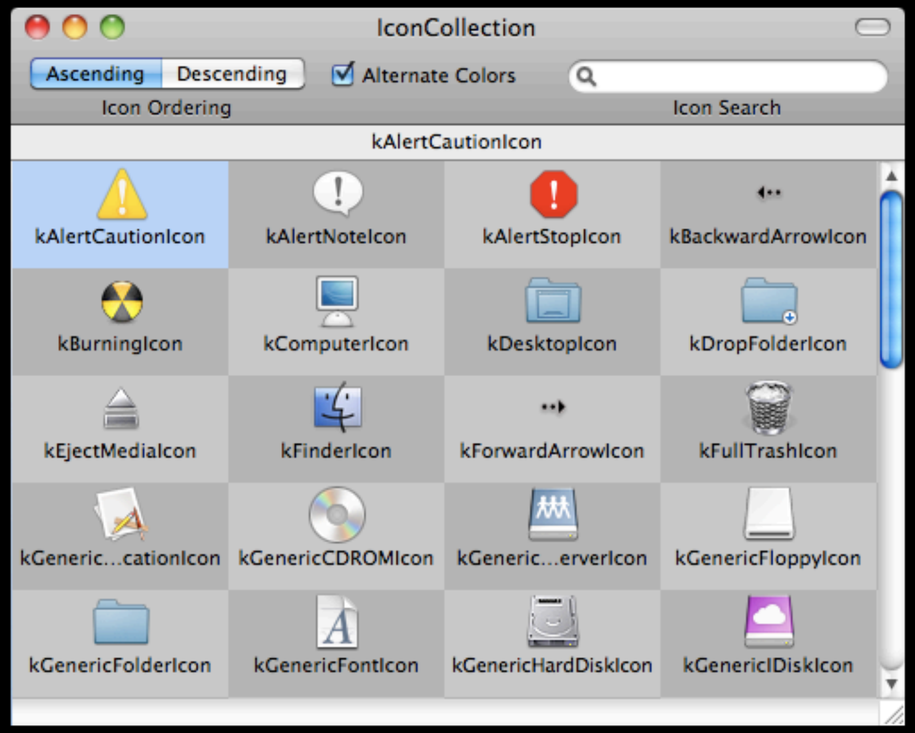
Text Processing in Cocoa	Presidio Friday 9:00AM

TextEdit Enhancements

- Concurrent document opening
  - Thread-safe document creation + one simple method override
- UTI adoption
- Save as PDF
  - UI + one simple method
- Text checking
  - UI + prefs + four method calls

NSCollectionView

NSCollectionView



- Introduced in Leopard
- Lots of improvements in Snow Leopard

Bug Fixes!

- Smoother relayout animations
- More predictable layout
- Autoresizing
- KVO-compliant -selectionIndexes
- More reliable
- Much more!

Nib-Based Items

- Binding to NSCollectionViewItem

```
@interface NSCollectionViewItem : NSViewController
```

  - Move prototype to dedicated nib
  - Connect prototype view and item (file's owner)
    - Set nib name and bundle identifier
- Exact replication
- Efficient, lazy loading
- Backwards compatible

Demo

Drag and Drop

- Familiar delegate APIs
  - Use indexes for efficiency
  - New APIs

```
- (NSCollectionViewItem *)itemAtIndex:(NSUInteger)index;
- (NSRect)frameForItemAtIndex:(NSUInteger)index;
```

- Local reordering
- Compatible with all NSDragPasteboard clients
- Click and hold

NSTableView

- Reload specific rows and columns
- Selection highlight
- Drag destination feedback
- Control focusing on cells or columns
- Configure column size-to-fit behavior
- Control column reordering

Presenting User Data with Table Views and Browsers	Nob Hill Thursday 10:30AM

NSBrowser

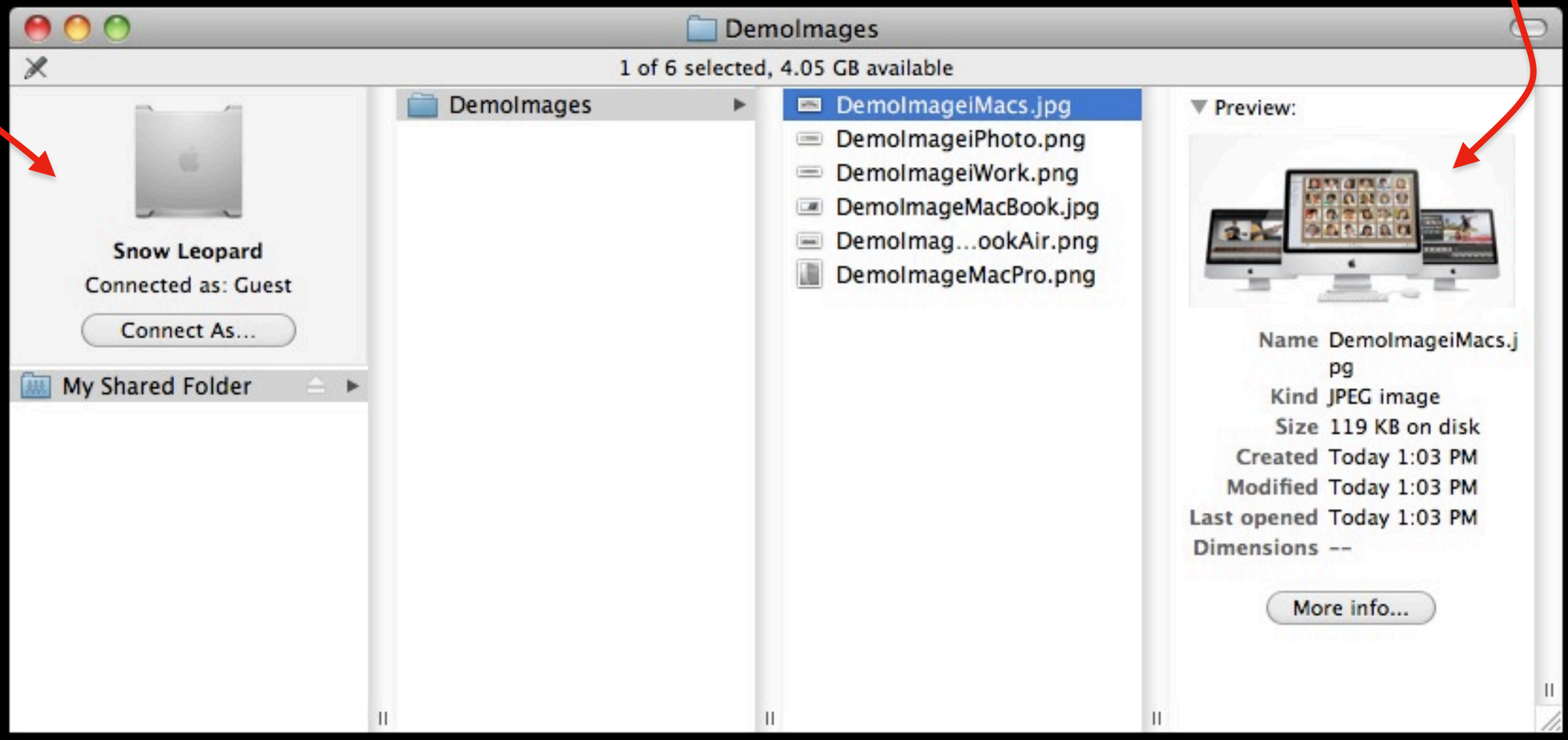
- Item-based delegate APIs
- Most new APIs require item-based delegate
- Variable row heights
- Editing
- Custom preview columns and column headers

Presenting User Data with Table Views and Browsers	Nob Hill Thursday 10:30AM

NSBrowser

Column header

Preview column



File System Efficiency

NSURL

NSURL

- Much more complete access to information about files
  - Eliminates need to convert between POSIX paths, FSRefs, NSStrings
- Caching to avoid hitting the disk
- Better error reporting

NSURL Property Access

```
- (BOOL)getResourceValue:(id *)value forKey:(NSString *)key error:(NSError **)error;
- (BOOL)setResourceValue:(id)value   forKey:(NSString *)key error:(NSError **)error;

- (NSDictionary *)resourceValuesForKeys:(NSArray *)keys error:(NSError **)error;
- (BOOL)setResourceValues:(NSDictionary *)keyedValues   error:(NSError **)error
```

```
NSString *NSURLNameKey;
NSString *NSURLLocalizedNameKey;
NSString *NSURLIsPackageKey;
NSString *NSURLHasHiddenExtensionKey;
NSString *NSURLCreationDateKey;         // NSDate
NSString *NSURLVolumeURLKey;
NSString *NSURLCustomIconKey;           // NSImage
NSString *NSURLEffectiveIconKey;        // NSImage
NSString *NSURLLabelColorKey;           // NSColor
NSString *NSURLFileSizeKey;
...
NSString *NSURLVolumeAvailableCapacityKey;
...
```

NSURL Path Utilities

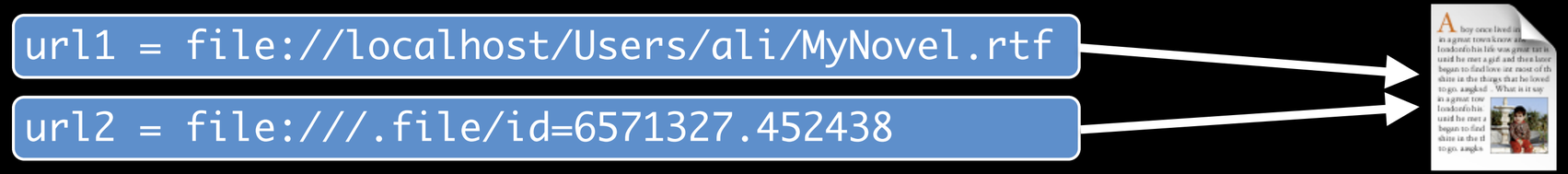
```
+ (NSURL *)fileURLWithPathComponents:(NSArray *)components;
- (NSArray *)pathComponents;
- (NSString *)lastPathComponent;
- (NSString *)pathExtension;
- (NSURL *)URLByAppendingPathComponent:(NSString *)pathComponent;
- (NSURL *)URLByDeletingLastPathComponent;
- (NSURL *)URLByAppendingPathExtension:(NSString *)pathExtension;
- (NSURL *)URLByDeletingPathExtension;

- (NSURL *)URLByStandardizingPath;
- (NSURL *)URLByResolvingSymlinksInPath;
```

File Reference URL

- Tracks a file by ID, so that it's referenced even after a rename
- Create one with -[NSURL fileReferenceURL]

```
NSURL *url1 = [NSURL fileURLWithPath:@"/Users/ali/MyNovel.rtf"];
NSURL *url2 = [url1 fileReferenceURL];
```



- Mostly transparent
- For specialized uses
- Not meant for persistence

NSURL Bookmarks

- NSData containing persistent form of an NSURL
- To create a bookmark

```
- (NSData *)bookmarkDataWithOptions:(NSURLBookmarkCreationOptions)options
     includingResourceValuesForKeys:(NSArray *)keys
                      relativeToURL:(NSURL *)relativeURL
                              error:(NSError **)error;
```

- To recreate NSURL from a bookmark

```
+ (id)URLByResolvingBookmarkData:(NSData *)bookmarkData
                         options:(NSURLBookmarkResolutionOptions)options
                   relativeToURL:(NSURL *)relativeURL
             bookmarkDataIsStale:(BOOL *)isStale
                           error:(NSError **)error;
```

NSFileManager

- NSURL versions of existing functionality; for example

```
- (BOOL)copyItemAtURL:(NSURL *)srcURL toURL:(NSURL *)dstURL error:(NSError **)error;
- (BOOL)moveItemAtURL:(NSURL *)srcURL toURL:(NSURL *)dstURL error:(NSError **)error;
- (BOOL)removeItemAtURL:(NSURL *)URL error:(NSError **)error;
...
```

- Directory enumeration

```
- (NSDirectoryEnumerator *)enumeratorAtURL:(NSURL *)url
                includingPropertiesForKeys:(NSArray *)keys
                                   options:(NSDirectoryEnumerationOptions)mask
                              errorHandler:(BOOL (^)(NSURL *url, NSError *err))hdlr;
```

  - Keys argument is a hint
  - Options allow skipping subdirectories, package contents, hidden files
  - A “NO” return from error handler stops enumeration

NSFileManager Safe Saving

```
- (BOOL)replaceItemAtURL:(NSURL *)originalItemURL
           withItemAtURL:(NSURL *)newItemURL
          backupItemName:(NSString *)backupItemName
                 options:(NSFileManagerItemReplacementOptions)options
        resultingItemURL:(NSURL **)resultingURL
                   error:(NSError **)error;
```

- NSDocument uses this
- You may never need to

NSFileWrapper

- API clean up
  - NSURL
  - NSError
  - Control over lazy and mapping behaviors
- More complete support for metadata

NSFileWrapper Reading

```
- (id)initWithURL:(NSURL *)url
          options:(NSFileWrapperReadingOptions)opts
            error:(NSError **)error;

- (BOOL)readFromURL:(NSURL *)url
            options:(NSFileWrapperReadingOptions)opts
              error:(NSError **)error;
```

```
enum {
    NSFileWrapperReadingImmediate         = 1,
    NSFileWrapperReadingWithoutMapping    = 2
};
```

- NSFileWrapper is normally lazy and may use mapping
  - Reading options allow turning these off

NSFileWrapper Writing

```
- (BOOL)writeToURL:(NSURL *)url
           options:(NSFileWrapperWritingOptions)options
originalContentsURL:(NSURL *)original
             error:(NSError **)error;
```

- Enables incremental saving
  - Provide previous version of document as originalContentsURL

NSWorkspace

- Asynchronous file copy and recycle

```
- (void)recycleURLs:(NSArray *)URLs
          completionHandler:(void (^)(NSDictionary *newURLs, NSError *error))handler;
- (void)duplicateURLs:(NSArray *)URLs
          completionHandler:(void (^)(NSDictionary *newURLs, NSError *error))handler;
```

- Example: Attempt to copy three files
  - One already copied, one not, and one nonexistent

```
newURLs = {
    "file://localhost/tmp/NotYetCopied" = "file://localhost/tmp/NotYetCopied copy";
    "file://localhost/tmp/AlreadyCopied" = "file://localhost/tmp/AlreadyCopied copy 2";
}
error = The file “Nonexistent” could not be duplicated because it was not found.
```

And More…

NSSavePanel

- Block-based sheet APIs

```
- (void)beginWithCompletionHandler:(void (^)(NSInteger result))handler;

- (void)beginSheetModalForWindow:(NSWindow *)window
               completionHandler:(void (^)(NSInteger result))handler;
```

NSSavePanel Block APIs

Bringing up a sheet in Leopard and Snow Leopard

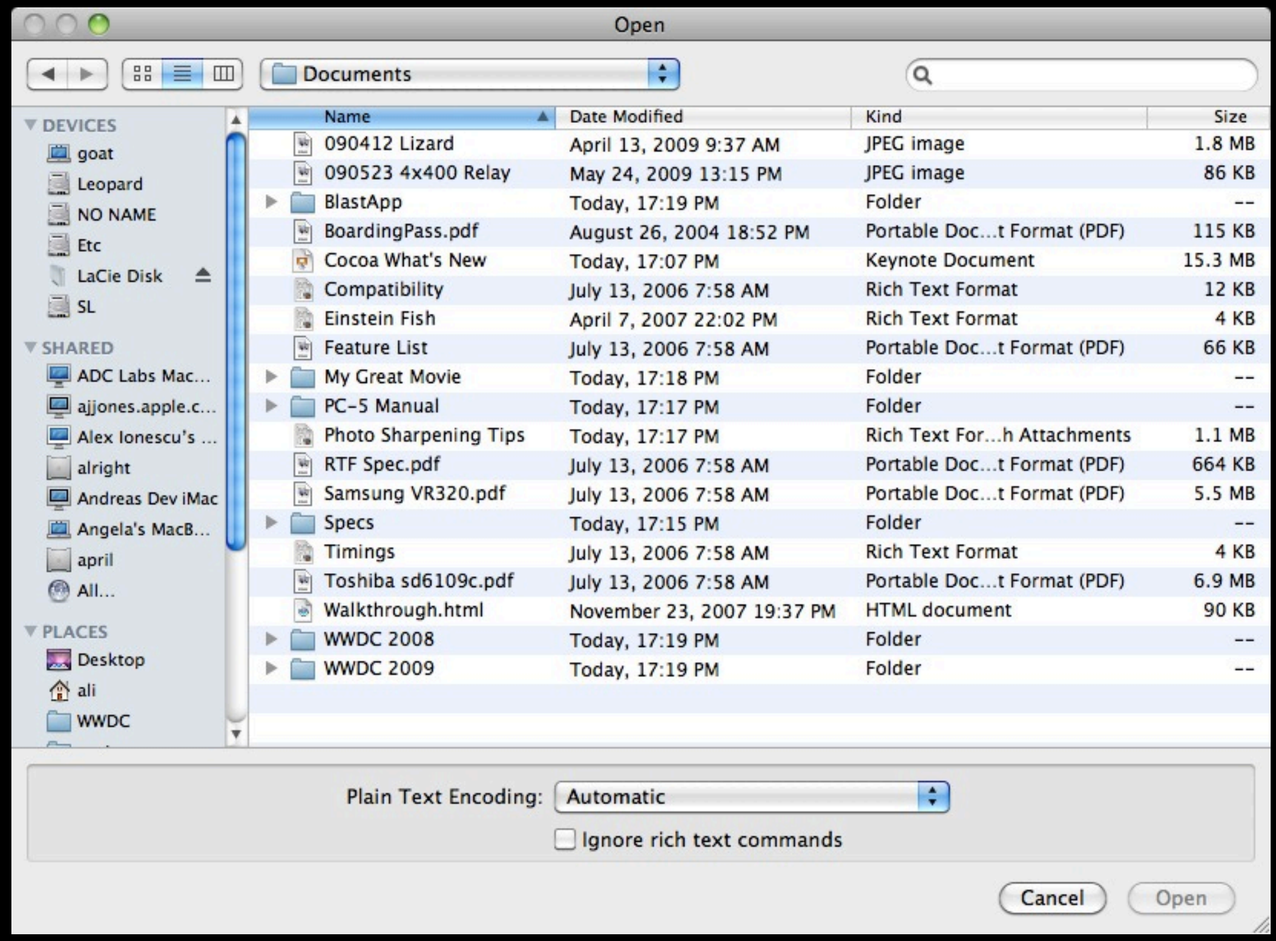
```
- (void)saveInLeopard:(id)sender {
    NSSavePanel *panel = [NSSavePanel savePanel];
    [panel beginSheetForDirectory:nil file:@"" modalForWindow:window
                    modalDelegate:self
                   didEndSelector:@selector(saveDone:returnCode:context:)
                      contextInfo:NULL];
}

- (void)saveDone:(NSSavePanel *)panel returnCode:(NSInteger)result context:(void *)ctxt {
    if (result == NSFileHandlingPanelOKButton) NSLog(@"File: %@", [panel URL]);
}
```

```
- (void)saveInSnowLeopard:(id)sender {
    NSSavePanel *panel = [NSSavePanel savePanel];
    [panel beginSheetModalForWindow:window completionHandler:^(NSInteger result) {
        if (result == NSFileHandlingPanelOKButton) NSLog(@"File: %@", [panel URL]);
    }];
}
```

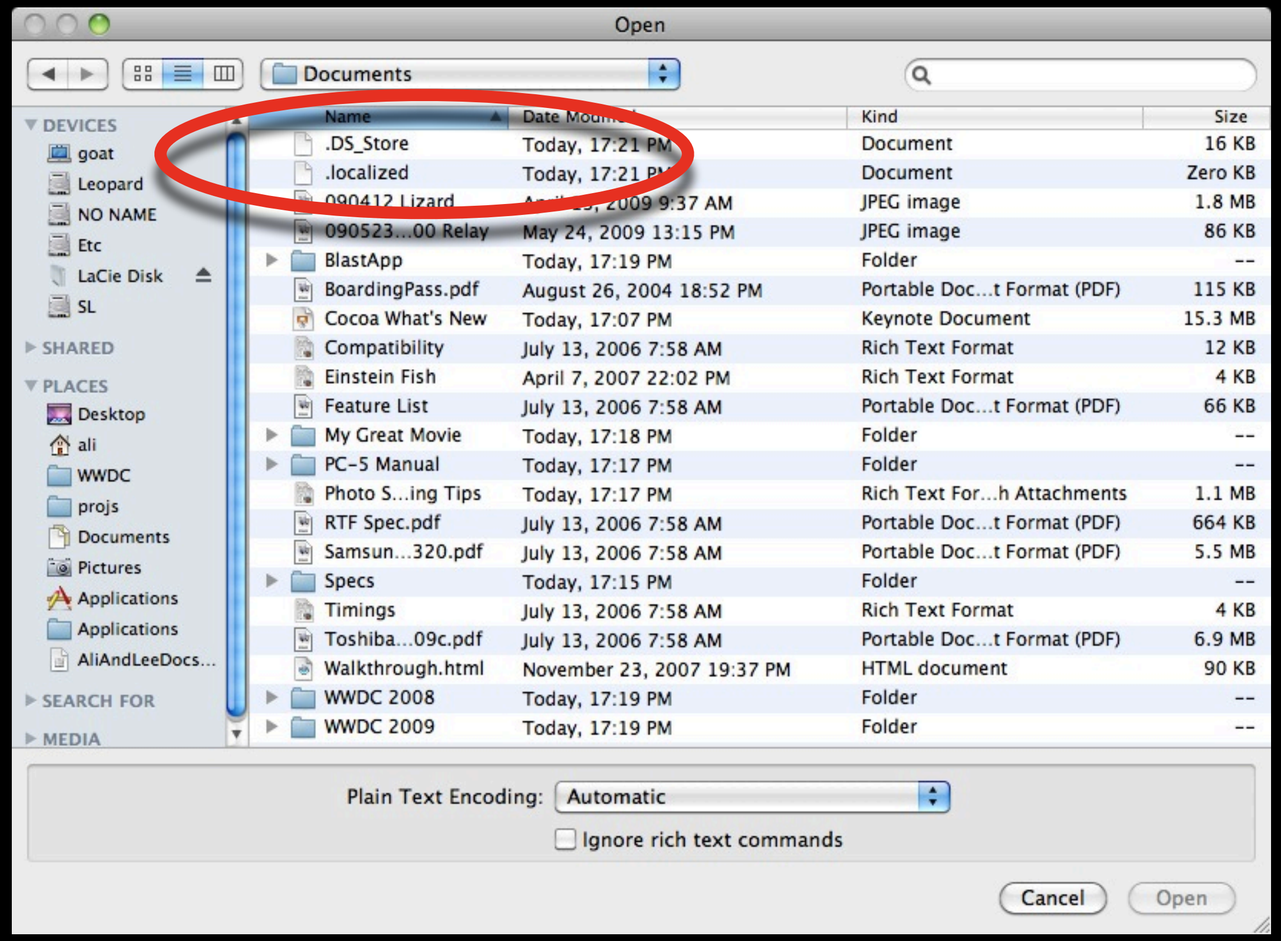
Open/Save Panel Tidbits

- Right click on the column header in list view to add additional columns



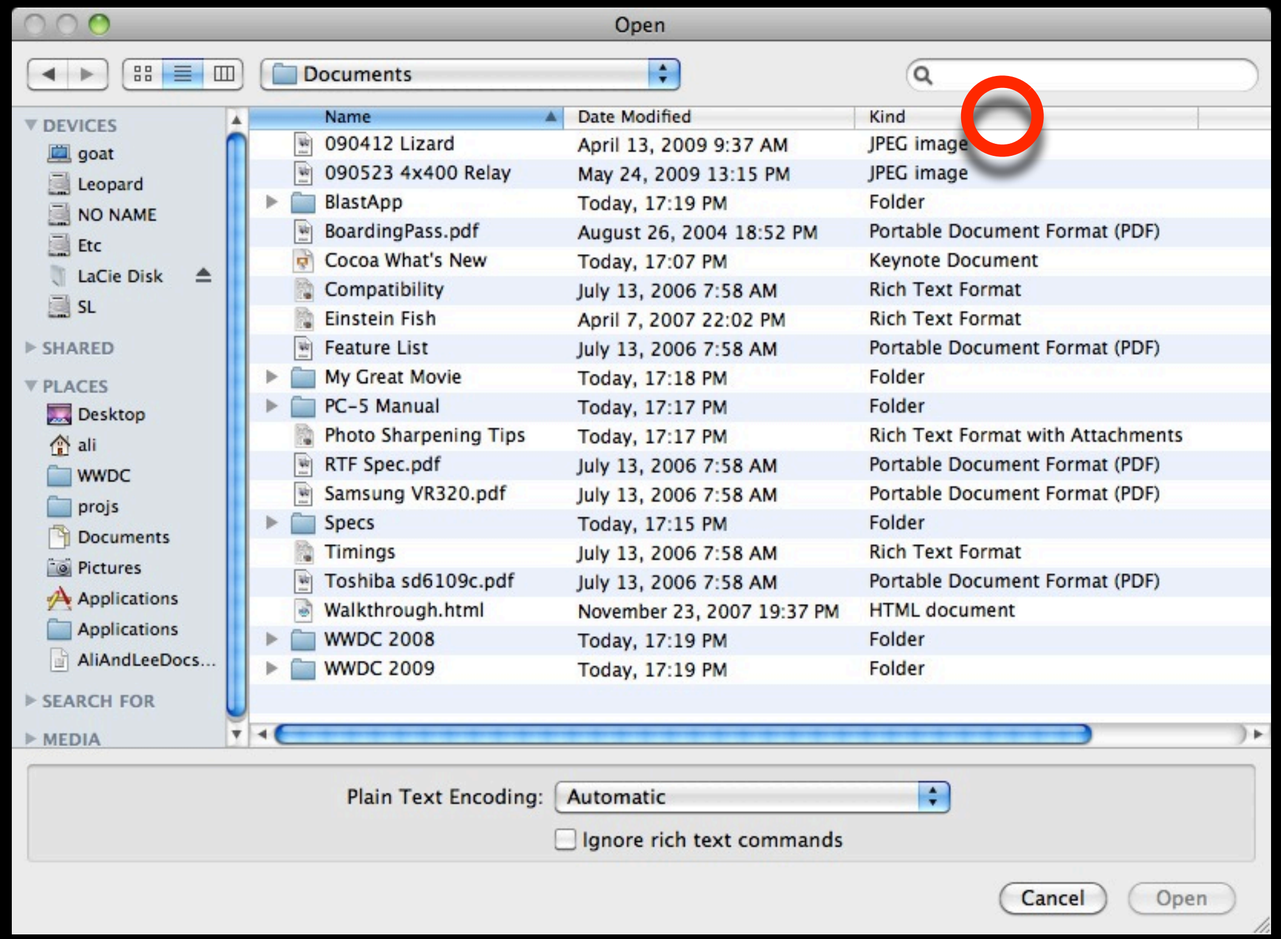
Open/Save Panel Tidbits

- Hit cmd-shift-period to temporarily view hidden files



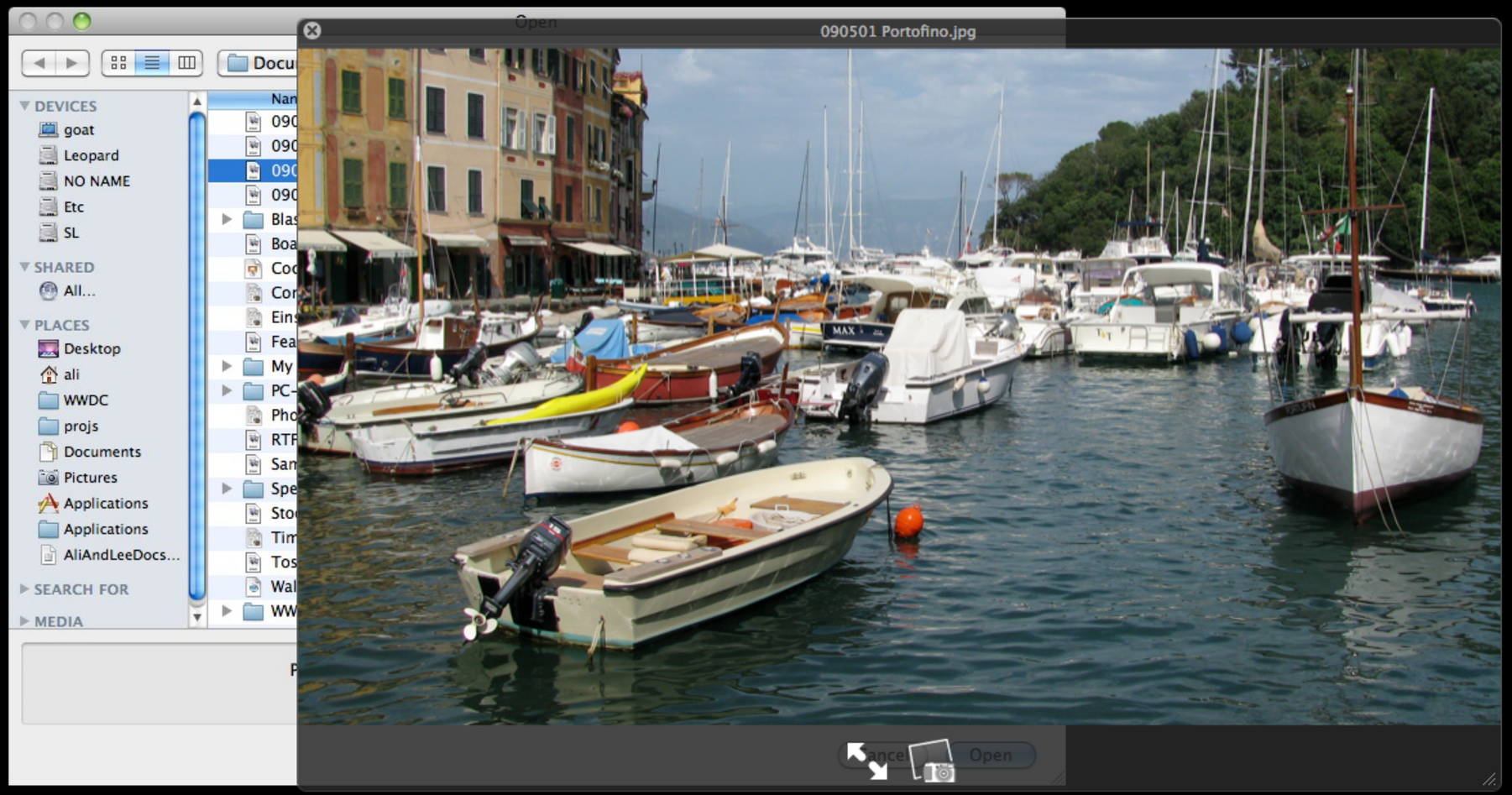
Open/Save Panel Tidbits

- Double-click right edge of header to automatically resize a column



Open Panel Tidbits

- Hit space in open panel to Quick Look selected files



NSImage

- Improved performance
  - Better "impedance match" with CGImage
  - No more caching of images in windows
- Some API changes as well

New in NSImage

- Ability to create with and extract a CGImage
- Better control over drawing parameters
- Hit-test a point or a rectangle
- Automatic interpretation of orientation info
- Ability to set accessibility description
- Ability to pass NSImage into -[CALayer setContents:]
- Many new standard images

NSImage in Snow Leopard	Nob Hill Thursday 3:30PM

NSView Layer Redrawing

- Specify when NSView layers are redrawn

```
- (void)setLayerContentsRedrawPolicy:(NSViewLayerContentsRedrawPolicy)policy;
- (NSViewLayerContentsRedrawPolicy)layerContentsRedrawPolicy;
```

- NSViewLayerContentsRedrawPolicy

```
enum {
    NSViewLayerContentsRedrawNever                  = 0,
    NSViewLayerContentsRedrawOnSetNeedsDisplay      = 1,
    NSViewLayerContentsRedrawDuringViewResize       = 2,
    NSViewLayerContentsRedrawBeforeViewResize       = 3
};
```

NSView Layer Redrawing

- Specify what to do when the layers are not redrawn

```
- (void)setLayerContentsPlacement:(NSViewLayerContentsPlacement)newPlacement;
- (NSViewLayerContentsPlacement)layerContentsPlacement;
```

- NSViewLayerContentsPlacement

```
NSViewLayerContentsPlacementScaleAxesIndependently      =  0,
NSViewLayerContentsPlacementScaleProportionallyToFit    =  1,
NSViewLayerContentsPlacementScaleProportionallyToFill   =  2,
NSViewLayerContentsPlacementCenter                      =  3,
NSViewLayerContentsPlacementTop                         =  4,
NSViewLayerContentsPlacementTopRight                    =  5,
NSViewLayerContentsPlacementRight                       =  6,
NSViewLayerContentsPlacementBottomRight                 =  7,
NSViewLayerContentsPlacementBottom                      =  8,
NSViewLayerContentsPlacementBottomLeft                  =  9,
NSViewLayerContentsPlacementLeft                        = 10,
NSViewLayerContentsPlacementTopLeft                     = 11
```

Multi-Touch

- Support for standard gestures on the trackpads of recent notebooks
  - Magnify
  - Swipe
  - Rotate
- Also support for arbitrary touch events

Multi-Touch

- Opt-in at the NSView level

```
- (void)setAcceptsTouchEvents:(BOOL)flag;
- (BOOL)acceptsTouchEvents;
```

- New NSResponder methods

```
- (void)touchesBeganWithEvent:(NSEvent *)event;
- (void)touchesMovedWithEvent:(NSEvent *)event;
- (void)touchesEndedWithEvent:(NSEvent *)event;
- (void)touchesCancelledWithEvent:(NSEvent *)event;
```

- New class NSTouch

User Events in Cocoa	Nob Hill Wednesday 3:30PM

NSDockTilePlugIn

- Enables an application to customize its dock tile when not running

```
@protocol NSDockTilePlugIn <NSObject>

@required
- (void)setDockTile:(NSDockTile *)dockTile;

@optional
- (NSMenu*)dockMenu;

@end
```

- Create a plug-in inside the application bundle
- Declare it via NSDockTilePlugIn in Info.plist
- Implement NSDockTilePlugIn on your principal class

Sudden Termination

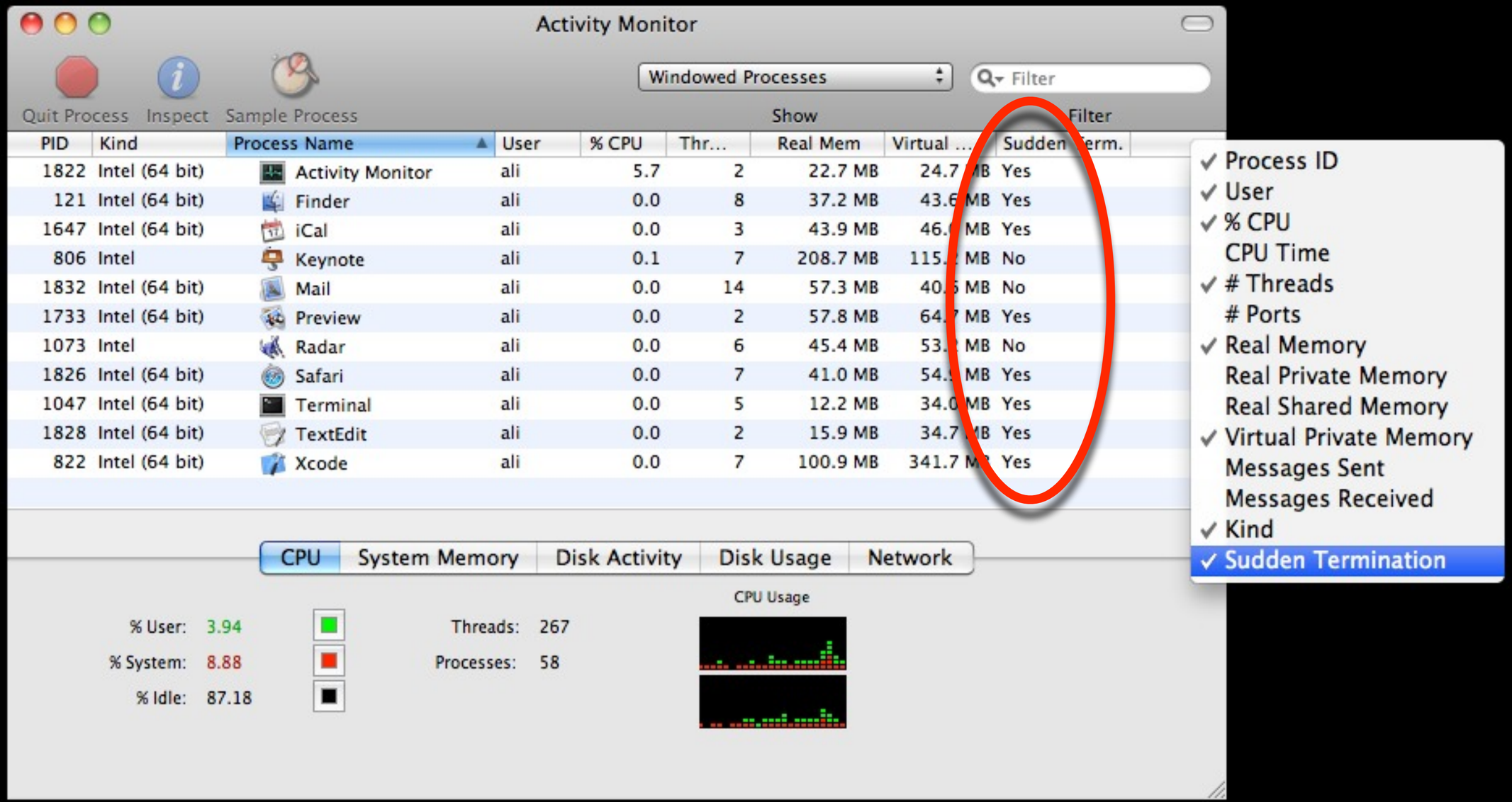
- Enables “clean” apps to be quit very quickly
- API to mark regions where the app isn’t clean

```
@interface NSProcessInfo
- (void)disableSuddenTermination;
- (void)enableSuddenTermination;
@end
```

- AppKit marks app as dirty during event dispatching
- Requires opt-in

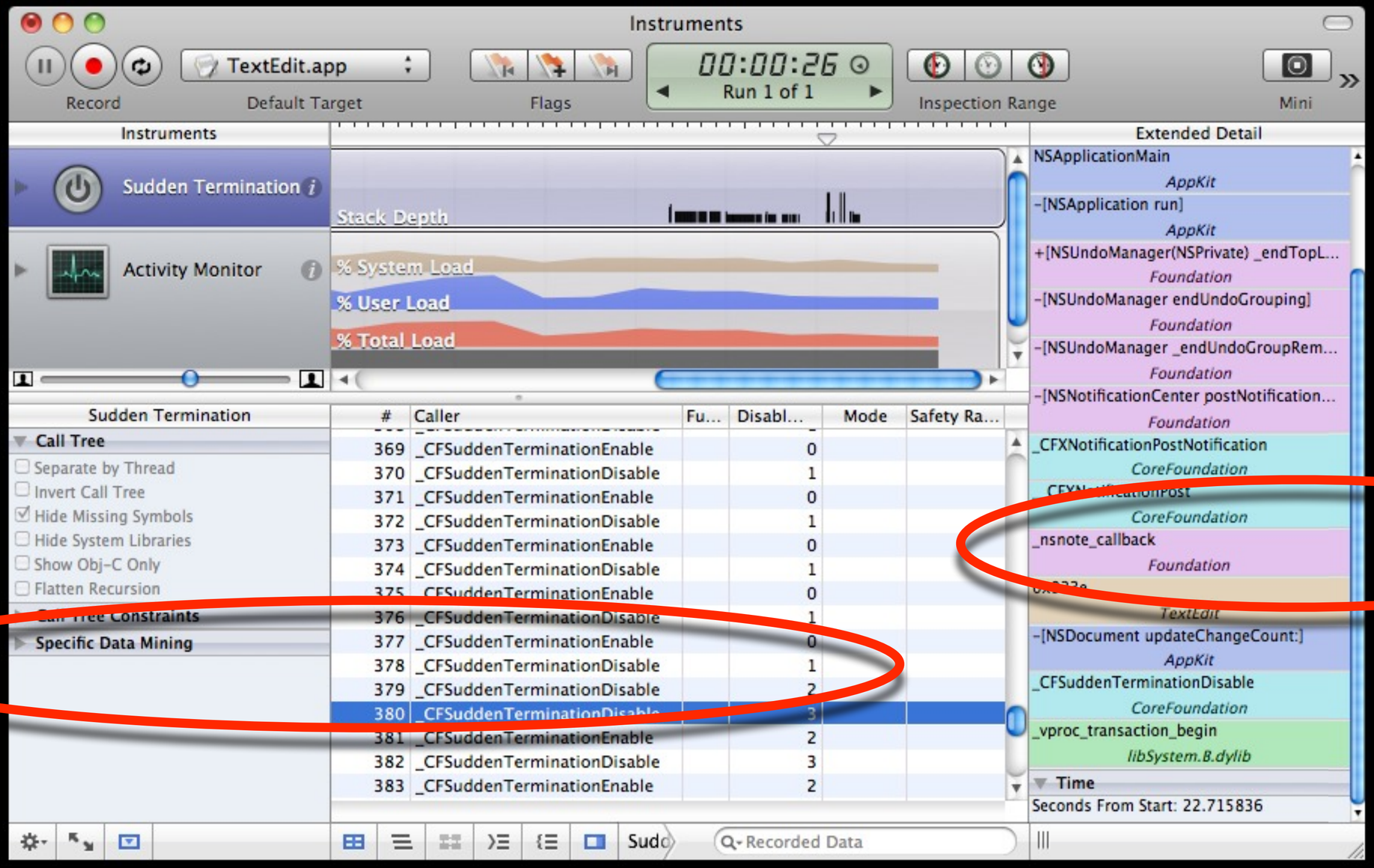
Sudden Termination

Activity Monitor support



Sudden Termination

Instruments support



Other Important Changes

- Formal protocol declarations for delegates and data sources
- New classes NSCache and NSPurgeableData
- NSStream support for property lists
- NSWindow and NSScreen color space support
- NSWindow display throttling (to beam-sync)
- Selection printing
- NSUserInterfaceItemSearching protocol
- New class NSTextInputContext
- Improvements in editing of bidirectional text
- Accessibility improvements

For More Information

- Release notes
  - AppKit (“Cocoa Application Framework”)
  - Foundation (“Cocoa Foundation Framework”)
- Changes docs
- Header files
  - Look for “10_6”
    - AVAILABLE_MAC_OS_X_VERSION_10_6_AND_LATER
    - DEPRECATED_IN_MAC_OS_X_VERSION_10_6_AND_LATER
    - MAC_OS_X_VERSION_10_6
- Documentation

A Few More Things You Can Do in 10.6

Read the release notes to find out more!

- Put URLs directly in preferences
- Sort file names “like Finder”
- Change the desktop image
- Get compiler warning for “NSLog(message)”
- Have NSErrors display a help button in alerts
- Animate integer and color-valued properties in NSView
- Have your finalized KVO observers automatically removed under GC

Related Sessions

State of the Art Cocoa: Application Design	Nob Hill Tuesday 10:30AM
State of the Art Cocoa: User Interface Design	Nob Hill Tuesday 2:00PM
Designing Your Cocoa Application for Concurrency	Nob Hill Tuesday 3:30PM
Concurrent Programming in Cocoa	North Beach Wednesday 9:00AM
What's New in Core Data	North Beach Wednesday 10:30AM
User Events in Cocoa	Nob Hill Wednesday 3:30PM
Objective-C and Garbage Collection Advancements	Russian Hill Wednesday 5:00PM

Related Sessions

Presenting User Data with Table Views and Browsers	Nob Hill Thursday 10:30AM
Pasteboards, Services, and Interoperability on Mac	North Beach Thursday 2:00PM
NSImage in Snow Leopard	Nob Hill Thursday 3:30PM
Cocoa Tips and Tricks	Nob Hill Thursday 5:00PM
Text Processing in Cocoa	Presidio Friday 9:00AM
Advanced Accessibility: Best Practices and New APIs	Mission Friday 2:00PM

Labs

Cocoa Open Lab	OS X Lab C Tuesday 3:30–6:15PM
Concurrent Programming in Cocoa Lab	OS X Lab D Thursday 9:00–11:45AM
Cocoa Open Lab	OS X Lab C Thursday 2:00–4:45PM
Core Data Lab	Snow Leopard Lab Friday 9:00–11:45AM

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